PATENT
Atty. Dkt. M00A283

CYCLIC AUTOTHERMAL HYDROCARBON REFORMING PROCESS

RELATED APPLICATION

JMS 2/24/04

This application is a continuation-in-part of pending U.S. Patent Application Serial No. 09/175,175, now US Patent 09/909,622, filed on October 20, 1998.

BACKGROUND OF THE INVENTION

Field of the Invention

This invention relates to the partial oxidation and/or reforming of hydrocarbons, and more particularly to the production of hydrogen and carbon monoxide by the partial oxidation of hydrocarbons, steam reforming of hydrocarbons or a combination of the two to achieve an auto-thermal process. Specifically, the invention relates to the use of an oxygen ion conducting ceramic in particulate form in a cyclic process, involving the reaction of oxygen in air feed with the ceramic in one step and the reaction of hydrocarbon feed, with or without steam, with the above oxygen-enriched ceramic in another step, to produce hydrogen and carbon monoxide products.

Description of Art

Synthesis gas and its components, hydrogen and carbon monoxide, are conventionally produced by the steam methane reforming (SMR) or by the high temperature partial oxidation of hydrocarbons with controlled amounts of air or oxygen. In the SMR process, a large amount of heat must be supplied into the reactor for sustaining the highly endothermic SMR reaction. Therefore, expensive shell-and-tube type reactors must be used to facilitate the heat exchange. The overall production rate of the SMR process